

Polynomials

$$\alpha x^2 + bx + c \\ \alpha + \beta = -\frac{b}{a}, \alpha \beta = ca \\ x^2 - (\alpha + \beta)x + \alpha \cdot \beta$$

$$ax^3 + bx^2 + cx + d \\ \alpha + \beta + \gamma = -\frac{b}{a}; \alpha\beta + \beta\gamma + \gamma\alpha = \frac{c}{a}; \alpha\beta\gamma = -\frac{d}{a} \\ x^3 - (\alpha + \beta + \gamma)x^2 + (\alpha\beta + \beta\gamma + \gamma\alpha)x - \alpha\beta\gamma$$

Trigonometry

$$\sin^2 \theta + \cos^2 \theta = 1 \\ 1 + \tan^2 \theta = \sec^2 \theta \\ 1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$$

θ	0°	30°	45°	60°	90°
$\sin \theta$	0	$1/2$	$1/\sqrt{2}$	$\sqrt{3}/2$	1
$\cos \theta$	1	$\sqrt{3}/2$	$1/\sqrt{2}$	$1/2$	0
$\tan \theta$	0	$1/\sqrt{3}$	1	$\sqrt{3}$	N.D
$\operatorname{cosec} \theta$	N.D	2	$\sqrt{2}$	$2/\sqrt{3}$	1
$\sec \theta$	1	$2/\sqrt{3}$	$\sqrt{2}$	2	N.D
$\cot \theta$	N.D	$\sqrt{3}$	1	$1/\sqrt{3}$	0

Real Numbers

$$\text{HCF}(a, b) \times \text{LCM}(a, b) = ab$$



Visit www.mathwithshanthi.com for free prep resources and to register for crash course.

Linear equations in two variables

$$a_1x + b_1y + c_1 = 0 \quad \frac{a_1}{a_2} \neq \frac{b_1}{b_2} \text{ unique solution} \\ a_2x + b_2y + c_2 = 0 \quad \frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2} \text{ infinite solutions} \\ \frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2} \text{ no solution}$$

Quadratic Equation

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

If $b^2 - 4ac > 0$, 2 distinct real roots
 If $b^2 - 4ac = 0$, 2 equal real roots
 If $b^2 - 4ac < 0$, no real roots
 If $b^2 - 4ac \geq 0$, two real roots

Statistics

Arithmetic Mean

$$\text{i) Direct method. } \bar{x} = \frac{\sum f_i x_i}{\sum f_i}$$

$$\text{ii) Assumed Mean } \bar{x} = a + \frac{\sum f_i di}{\sum f_i}$$

$$\text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) h$$

$$\text{Median} = l + \left(\frac{\frac{n}{2} - Cf}{f} \right) h$$

Empirical formula:

$$3 \text{ Median} = \text{Mode} + 2 \text{ Mean}$$

Areas related to circles

$$\text{Arc length} \frac{\theta}{360} \times 2\pi r$$

$$\text{Area of sector} \frac{\theta}{360} \times \pi r^2 \text{ (or)} \frac{l \cdot r}{2}$$

AP

$$a_n = a + (n-1)d$$

$$S_n = \frac{n}{2} [2a + (n-1)d]$$

$$S_n = \frac{n}{2}(a+l)$$

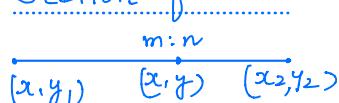
Surface area and volume

	LSA	TSA	Volume
cube	$4a^2$	$6a^2$	a^3
cuboid	$2(lb + bh + hl)$	$2(lb + bh + hl) + 2lbh$	lbh
Cylinder	$2\pi r^2 h$	$2\pi r^2 h + 2\pi rh$	$\pi r^2 h$
Hollow cylinder	-	$2\pi h (R+r) + 2\pi (R^2 - r^2)$	$\pi (R^2 - r^2) h$
cone	$\pi r^2 l$	$\pi r^2 l + \pi r^2$	$\frac{1}{3} \pi r^2 h$
Sphere	-	$4\pi r^2$	$\frac{4}{3} \pi r^3$
Solid hemisphere	$2\pi r^2$	$3\pi r^2$	$\frac{2}{3} \pi r^3$
Hollow hemisphere	-	$2\pi (R^2 + r^2) + \pi (R^2 - r^2)$	$\frac{2}{3} \pi (R^3 - r^3)$

Coordinate Geometry

$$\text{Distance formula} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Section formula



$$(x, y) = \left(\frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n} \right)$$

$$\text{Mid point formula} \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$\text{Centroid formula} \left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right)$$